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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
RODGERS, COLLEEN E	

ART UNIT	PAPER NUMBER
2813	

NOTIFICATION DATE	DELIVERY MODE
10/19/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/519,406	DI CIOCCIO ET AL.	
	Examiner	Art Unit	
	Colleen E. Rodgers	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *8-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *8-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action responds to the Amendment filed 6 August 2007. By this amendment, claim 8 is amended and claim 15 is newly added.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 8-12, 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Goesele et al** (USPN 6,150,239) in view of **Usenko** (USPN 6,995,075).

Regarding claim 8, **Goesele et al** disclose a method for transferring an electrically active thin film from an initial substrate to a target substrate, comprising:

ion implantation through one face of the initial substrate to create a buried, embrittled film at a determined depth in relation to the implanted face of the initial substrate, a thin film thus being delimited between the implanted face and the buried face [see col. 4, lines 24-29 and lines 56-59];

fastening the implanted face of the initial substrate with a face of the target substrate [see col. 5, lines 12-14];

separating the thin film from a remainder of the initial substrate at a level of the buried film [see col. 5, lines 15-25].

Goesele et al do not disclose a step of thinning down the thin film transferred on the target substrate. **Usenko** discloses a method of forming a thin film **111** on a target substrate **107** by

delamination of a layer **111** from an initial substrate **101** [see Fig. 1]. Furthermore, **Usenko** discloses thinning the layer **111** [see col. 1, lines 58-61]. It would have been obvious to one of ordinary skill in the art at the time of invention to thin the layer because **Usenko** teaches that it removes the worst quality part of the layer [see col. 2, lines 44-49].

Furthermore, **Goesele et al** do not specify wherein the implantation dosage, energy and current are chosen, during the ion implantation, so that concentration of implantation defects is less than a determined threshold, resulting in, within the thinned down thin film, a number of acceptor defects that is compatible with desired electrical properties of the thin film. However, this constitutes routine optimization of process parameters to achieve a result. Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." See *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Regarding claim 9, the prior art of **Goesele et al** and **Usenko** disclose the method according to claim 8. Furthermore, **Goesele et al** disclose wherein the ion implantation includes implanting ions chosen from among the following species: hydrogen and rare gases [see col. 6, lines 29-33].

Regarding claim 10, the prior art of **Goesele et al** and **Usenko** disclose the method according to claim 8. Furthermore, **Goesele et al** disclose wherein the fastening includes direct wafer bonding, which comprises molecular adhesion [see col. 5, lines 12-14].

Regarding claim 11, the prior art of **Goesele et al** and **Usenko** disclose the method according to claim 8. Furthermore, **Goesele et al** disclose a step of healing annealing of the implantation defects on the thin film [see col. 5, lines 15-17].

Regarding claim 12, the prior art of **Goesele et al** and **Usenko** disclose the method according to claim 8. Furthermore, **Goesele et al** disclose wherein the healing annealing is carried out before the separating the thin film from a remainder of the initial substrate, which is carried out before the healing annealing step of **Usenko** [see **Goesele et al**, col. 5, lines 15-25; see also **Usenko**, col. 2, lines 44-49].

Regarding claim 14, the prior art of **Goesele et al** and **Usenko** disclose the method according to claim 8. Furthermore, **Goesele et al** disclose wherein application of the method according to claim 8 to obtain a thin film of SiC or diamond [see col. 3, line 66 to col. 4, line 2].

Regarding claim 15, the prior art of **Goesele et al** and **Usenko** disclose the method according to claim 14. Neither **Goesele et al** nor **Usenko** disclose wherein the thickness of the SiC film is less than or equal to 0.5 μm nor wherein the concentration of defects is less than 9×10^{20} atoms/cm^3. However, these claims are *prima facie* obvious without a showing that the claimed ranges achieve unexpected results relative to the prior art range. *In re Woodruff*, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also *In re Huang*, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996) (claimed ranges of a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also *In re Boesch*, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill of art) and *In re Aller*, 105 USPQ 233 (CCPA 1955) (selection of optimum ranges within prior art in general conditions is obvious). In this case, there exists no evidence of record that the thickness of the SiC film or the concentration of defects provides unexpected results in the thin film produced. One of ordinary skill in the art would be motivated to optimize the thickness of the SiC and the concentration of defects to provide for device performance and processing limitations.

4. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Goesele et al** (USPN 6,150,239) in view of **Usenko** (USPN 6,995,075) as applied to claims 8-12, 14 and 15 above, and further in view of **Maleville et al** (USPN 6,403,450). The prior art of **Goesele et al** and **Usenko** disclose the method according to claim 8. Neither **Goesele et al** nor **Usenko** disclose wherein the healing annealing is carried out after the thinning down the thin film. **Maleville et al** disclose a method of thinning a semiconductor layer by formation of a sacrificial oxide, followed by an healing annealing step [see col. 7, lines 23-30]. It would have been obvious to one of ordinary skill in the art at the time of invention to include a healing annealing step after the thinning process because **Maleville et al** teach that it heals the defects generated by the formation of the surface oxide layer and stabilizes the bonding interface [see col. 7, lines 23-30].

Response to Arguments

5. Applicant's arguments filed 6 August 2007 have been fully considered but they are not persuasive. On page 5 of the Remarks, Applicants allege, "Goesele does not teach or suggest that a buried film and a thin film are formed in the first substrate as required by independent Claim 8. Goesele discloses the formation of only the thin film and not the buried film" (see page 5).

The Examiner respectfully disagrees. The implantation taught by **Goesele et al** forms a brittle buried film at the depth to which the hydrogen-trap inducing element is implanted [see col. 4, lines 24-29]. Above this brittle buried film is the thin film of defect-free silicon carbide, diamond, or other substrate material [see col. 3, line 67 to col. 4, line 2]. The rejection stands as outlined above.

Furthermore, on pages 5-6 of the Remarks, Applicants allege that the act of selecting the quantities of implantation dosage, energy and current "is uniquely challenging or difficult for one of ordinary skill in the art, which does not indicate routine experimentation as suggested" (see page 6).

The Examiner respectfully submits that a mere statement that the selection of the quantities in question is difficult and beyond the scope of routine experimentation by one of ordinary skill in the art does not constitute a legal showing that the claimed quantities are non-obvious. Therefore, the rejection stands.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Colleen E. Rodgers whose telephone number is (571) 272-8603. The examiner can normally be reached on Monday through Friday, 9:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

CER

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